

In November 2012 a geophysical survey was conducted by the Archaeological Prospection Services of the University of Southampton (APSS) and the Maritime Archaeology Stewardship Trust (MAST) with Dr Mark Beech and Peter Sheehan of Abu Dhabi Tourism and Culture Authority (TCA Abu Dhabi), on the island of Ghagha, lying some 3km off the coastline of the Al Gharbia (Western Region) in Abu Dhabi emirate, within the United Arab Emirates. The aim of the survey was to locate and map archaeological remains from a number of key sites on the island, spanning the main periods of habitation. An extensive archaeological reconnaissance was also conducted, utilising both hand-held and differential GPS, to assess the archaeological potential of the island, and to compare the current preservation of archaeological sites with the results of the Abu Dhabi Islands Archaeological Survey (ADIAS) conducted in the early 1990s.

The archaeology of the islands of Abu Dhabi covers the majority of the chronological range of the region, from the Neolithic period (mid 6th millennium BC) to 20th century settlement, with the coast of Al Gharbia giving evidence of Middle Palaeolithic material. Ghagha island is the westernmost of the Abu Dhabi islands which stretch along the southern coast of the Arabian Gulf, and include the islands of Abu Al-Abyadh, Marawah, Sir Bani Yas and Delma. The western islands comprise Ghagha, al-Ufzayyag and the Yasats, all situated off the Sila peninsula close to the border with Saudi Arabia. Evidence of earliest settlement on the islands of Abu Dhabi take the form of middens running along the coastline of many of the islands, hearths and other associated posthole or pit features, and artefact scatters. Surveys forming part of the work undertaken by ADIAS have located such evidence on islands including Abu Al-Abyadh and Ghagha. A number of fish traps are also visible on the island, similar to those found elsewhere on islands along the Abu Dhabi coastline including Qamein, Yasat and Delma (as mentioned in ISAP News Issue 30). While difficult to date, some of these traps may have some antiquity judging from their relative

submerged position in relation to present day sea level.

On Ghagha (Fig. 1) previous survey in the 1990s located a number of midden sites along the coast of the island. Some of these sites appear to be associated with the pre-oil era villages, although earlier deposits of material are also present. The earliest site mapped (J), dating from the 5th millennium BC onward, is located on a promontory on the northern part of the island, and comprises a series of stone mounds. A later artefact scatter (K) dating to the 3rd-2nd millennium BC was also located on the south-west portion of the island. A number of possible Bronze Age sites are located on Ghagha, principally taking the form of cairns of beach stone, similar to cairn sites found elsewhere in the region. The current survey mapped a collection of cairns in the north-western zone of the island, potentially dating to this period.



Figure 1. Satellite image of Ghagha Island with principal sites marked.

The ADIAS survey located a scatter of material dating to the 3rd-4th century AD, Late Pre-Islamic period, in the centre of the island. This site had surface pottery which has parallels with ceramic types found at Ed-Dur, Mleiha and Ra's Bilyaryar. A series of three platforms were noted in the vicinity during the current survey, suggesting settlement of this period on Ghagha.

Three pre-oil era settlement sites, abandoned in about 1960, are also visible on the island, comprising a north village, south village and a

single building associated with a palm plantation in the centre of the island. In addition to the sites noted above, the island is covered with other ephemeral settlement remains, including middens (Fig. 2), cairns, cemeteries, 'outline mosques' stone structures and other features, including fish traps (Fig. 3). The precise nature of these features and their broad chronology is difficult to ascertain. Some features, including a small mound in the vicinity of the southern village, and some of the possible mounds or cairns, are difficult to identify and date in terms of their form. However the wealth of archaeological sites on the island is undisputed. Comparison of the reconnaissance survey of the island in the 2012 season with the ADIAS survey shows that many of the more ephemeral sites have been greatly eroded, either through natural deflation of the soil, or through modern human activity. The widely distributed and ephemeral nature of the monuments on the island, and the limited understanding of some of the forms of features, required a new strategy that combined new reconnaissance survey and more intensive topographic and geophysical survey of target sites.



Figure 2. Midden material eroding from the modern ground surface at one of the sites.

The aim of the archaeological survey at Ghagha was to conduct a broad reconnaissance survey for comparison with the results of the ADIAS survey in the 1990s, to assess the current state of preservation of archaeological sites on the main west island, and to map any sites present on the less accessible east island. More intensive topographic and geophysical survey was also applied to map the nature and extent of particular archaeological sites from different periods of the island's habitation. Ground

Penetrating Radar (GPR) and magnetometry were applied to map archaeological deposits at one of the ore-oil era settlement sites, the Late Pre-Islamic settlement and the Bronze Age cairn site in the north-west portion of the island. In addition the field season was used to assess the island in the context of a dynamic maritime cultural landscape. This very much drew on previous surveys of the island, particularly the ADIAS survey of the 1990's, and aimed to map the changing use of the island over time. It also sought to highlight the critical role of the sea in this respect regarding fishing, pearling, trading and the importance of the island within the broader maritime landscape.

Both magnetometry and Ground Penetrating Radar (GPR) were applied for the surveys. Results of these techniques are extremely dependent on the geology of the particular area, and whether the archaeological remains are derived from the same materials. The presence of a variety of archaeological features of different periods, including cairns, house platforms and beach stone houses and courtyards, some comprising possible burnt layers in the archaeological record, provided adequate conditions for the use of magnetometry at the different sites. The ground conditions and nature of materials indicated that a GPR survey of targeted areas would be productive. The beach stone and coral construction of many of the structures, in contrast to the surrounding sandy beach deposits, provided good conditions for the GPR. In addition to the geophysical survey methods, a topographic survey was conducted in different areas using a differential GPS, taking accurate measurements on archaeological features. Elevation points taken over different areas provided data on the form and extent of different visible deposits and structures across the island.

The results of the topographic and geophysical surveys on Ghagha Island, together with the broader field reconnaissance, give a comprehensive cross-section of the type and nature of the archaeology of the island. The general distribution of middens, cairns, fish traps and material scatters from the prehistoric phases of occupation of the island indicate the presence of a population on the island gathering and utilising the marine resources of this part of the Arabian Gulf. The biggest challenge that a

number of these sites face, however, derives from modern disturbance of the sometimes ephemeral archaeological deposits, and the eroded and deflating nature of the deposits and soils on the island.



Figure 3. Fish trap at high tide in the inlet on the western part of the island.

The coastal field walking survey used handheld GPS to note the location of over forty new sites of varying date and archaeological signature. These sites offer huge potential to further appreciate the maritime nature of the island over time, suggesting extensive fishing, shell processing and pearling, together with stone structures representing potential domestic, industrial and religious practise. Of particular note in this respect is the mapping of the substantial fish trap noted in the western bay. Within living memory fish traps have been used along much of the southern coast of the Arabian Gulf, although precise dating of their construction is problematic without comparative typological examples. However, it is believed that existing traps are likely to have been in use, and subject to continuous repair, over an extended period of time until their recent abandonment and subsequent decline.

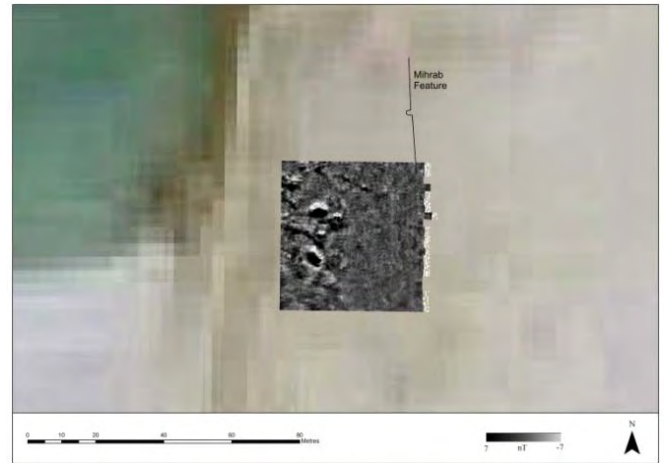


Figure 4. Magnetometer survey results of the cairnfield or hut circle features.

The survey of the prehistoric site on the north-west part of the island (Fig. 4) shows the presence of what appears to be either a small cairnfield or series of hut circles overlooking a small bay. Anomalies in the magnetometry show deposits within some of the features, suggesting possible burnt deposits associated with burials or settlement structures. Furthermore, the results of both magnetometry and GPR indicate far more cairns or hut circles than are visible on the surface. What is also apparent in the results is the effective erosion of features in the extreme south and east of the survey areas, closest to possible drainage features on the surface of the area. The site overlooks a bay to the west, and is located on one of the highest and most exposed areas of the island, similar to a much more eroded prehistoric concentration of material located on the northernmost promontory of the island (Site J) that has been almost completely lost due to erosion and extensive land use. The exact nature of the features will require further investigation, possibly excavation, in future seasons of work.



Figure 5. Interpretation plot superimposed on the digital elevation model of the late pre-islamic settlement.

The Late Pre-Islamic period site in the north-central part of the island (Fig. 5) also marks one of the more ephemeral areas of archaeological importance on Ghagha Island. The site comprises three small building platforms, each c. 7m across, with the presence of an enclosure to the south of the largest structure. The topographic variation of these features, as with the cairnfield, is small, suggesting a heavily eroded site, although 0.3-0.5m of deposits may be present at the site. It suggests rectangular features possibly with internal units similar to Late Pre-Islamic buildings known at Mleiha probably part of a small farm or habitation, overlooking the central part of the island.

Survey of the southern village on the island (Fig. 6) revealed that, in addition to the extant building remains, several potential structures lie buried at the village, with two possible courtyards also present. In addition a feature that seems to relate to the earlier settlement of the island, potentially similar to the Late Pre-Islamic period site situated further north, is located on the edge of the modern village, together with a series of small buried stone or pit features to the south-west of the village, marking a possible cemetery or series of markers. Finally the survey

of the buildings and the geophysical survey in the south village shed light on the extent of the pre-oil era settlement in this part of the island, including the extant remains of buildings and courtyards, and their buried counterparts. Several potential buried structures were noted in the magnetometry survey, and both magnetometry and GPR located a further structure, marked by a rise in the topography, suggesting an earlier settlement in the area, possibly of Late Pre-Islamic date.

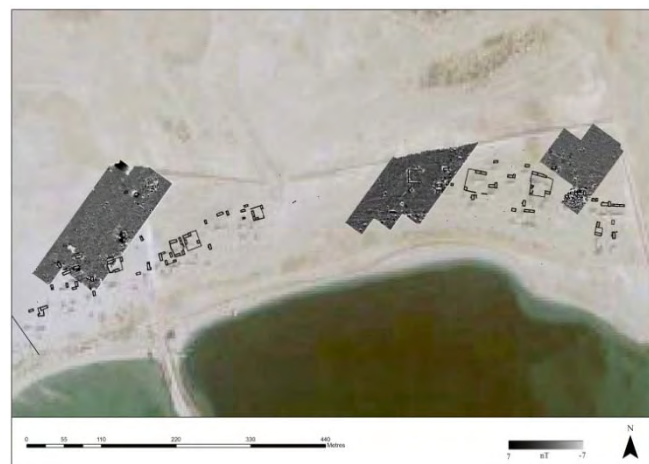


Figure 6. Results of the magnetometer survey at the southern village.

Instruments for Archaeological & Geophysical surveying

- **Foerster 4 channel fluxgate magnetometer**
- **Bartington GRAD-601 Dual magnetometer**
- **Geoscan Research RM15 Advanced**
- **Allied Tigre resistivity imaging systems**
- **GSSI Ground Radar systems**
- **Geonics EM conductivity meters**
- **ArcheoSurveyor software**
- **Geometrics seismographs**



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